

WHAT IS CLAIMED IS:

1. A friction stir welding apparatus for joining members of a work by inserting a rotating tool into the work and moving the rotating tool relative to the work, comprising a controller for controlling a relative distance in a tool insertion direction between the tool and the work or an insertion depth of the tool into the work so that a load factor or electric current of a spindle motor for rotating the tool is within a predetermined range.

2. A friction stir welding apparatus according to claim 1, further comprising a laser displacement meter or a contact type displacement meter for detecting the relative distance in a tool insertion direction between the tool and the work during the joining operation or the insertion depth of the tool into the work, the detected values being reflected on the controller.

3. A friction stir welding apparatus for joining members of a work by inserting a rotating tool, rotated by a spindle motor, into the work and moving the rotating tool relative to the work, comprising a controller for controlling a relative distance in a tool insertion direction between the tool and the work or an insertion depth of the tool into the work so that a load factor or electric current of the spindle motor is within a predetermined range.

4. A friction stir welding apparatus according to claim 3, further comprising a laser displacement meter or a contact type displacement meter for detecting the relative distance in a tool insertion direction between the tool and the work during the joining operation or the insertion depth of the tool into the work, the detected values being reflected on the controller.

5. A friction stir welding method of joining members of a work by inserting a rotating tool into the work and moving the rotating tool relative to the work, comprising the step of controlling a relative distance in a tool insertion direction between the tool and the work during the joining operation or an insertion depth of the tool into the work so that a load factor or electric current of a spindle motor for rotating the tool is within a predetermined range.

6. A friction stir welding method according to claim 5, wherein the relative distance in a tool insertion direction between the tool and the work during the joining operation or the insertion depth of the tool into the work is detected by a laser displacement meter or a contact type displacement meter, and the detected values are reflected on the controller.